CONFIDENTIAL

22 April 1964

MEMORANDUM FOR: Director, NPIC

VIA : Executive Director, NPIC

SUBJECT : A Study to Investigate Image Compression

REFERENCE : Chief, Administrative Staff, O, DD/I, Memorandum dated 4 February 1964: Approval of Research and Development Activities.

In accordance with the authority delegated by paragraph 3 of the reference, approval to undertake a study to Investigate Image Compression - [redacted], in the amount of [redacted] for a one month's period is requested. 25X1

25X1 [redacted]

Assistant for Plans and Development, NPIC

CONCUR:

25X1 [redacted]

Executive Director, NPIC

[redacted]
Date

APPROVED:

25X1 [redacted]

Arthur C. Lundahl
Director, NPIC

[redacted]
Date

Attachment:
Annex A

Distribution:
Orig & 1 - AS/LB/NPIC w/a
2 - O/D w/a
2 - P&DS/DB/NPIC w/a

NGA Review Complete

[redacted]

25X1 NPIC/P&DS/DB [redacted] (22 April 1964)

Research and Development
Project Approval Request

I. Identification

The Development Staff of the National Photographic Interpretation Center intends to undertake a study proposed by [redacted] 25X1

25X1 [redacted] The initial phase, a Proposal to Investigate Image Compression, will establish the feasibility of further study and will cost

25X1 [redacted] This study will be included in the Fiscal Year 1964, Class 700, "I. Special Techniques and Development Studies" under "Image Correlation Techniques and Equipment".

II. Objectives

It is the purpose of this study to provide the initial feasibility study for optical image integration by the human visual system. The study will establish the integrating capability of the human visual system and its tolerance to variation in registration, shape and shading in the multiple image integration process. If this program is successful, it will lead to a more encompassing study that will produce additional data which will be useful in determining the results of image integration. An effort will then be made to establish the effectiveness of image integration considering such factors as scale changes, tilt, orientation, sun altitude and sun azimuth. Eventually, it will be possible to determine the conditions best suited for application of image enhancement procedures from a strictly human visual system approach. This information will then be applicable to an optico-mechanical concept of image integration and enhancement.

III. Background

Extensive studies have been made through spatial filtering techniques and mechanical image integration which proved valuable in rather restricted applications. Limitations to "identical" photographs or to modified spatial frequency filtered photography were considered but no operational equipment was produced. The instruments available at present can produce imagery but only after a rather tedious alignment procedure. This multiple exposure correlation or alignment of imagery presents the most difficult process in multiple image integration.

This approach may or may not produce an answer unto itself as to the ultimate in image enhancement; however, data obtained will be applicable to other multiple image correlation studies. There has been no study made of the human visual system's capability of integrating images when presented with a number of successive exposures, upon which the signal is repetitive and the noise is random. From the results of this approach, a further study is possible to determine the effects of systematic deviations in orientation, shape and shading.

Research and Development
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IV. Technical Specifications

In this study of the human visual system's capability for image integration, the recognition thresholds will be obtained for single frame photography for variables of target contrast and viewing distances. In addition, continuous loops of film will be produced to determine effective image correlation and image presentation as a function of contrast, viewing distance and viewing projection rates.

V. Contractor and Financial Arrangements

The [redacted] was the only company solicited. Due to their extensive work in this field and clearances held by their personnel, this company is considered foremost in an endeavor of this type. The length of time the initial phase of this contract will require is approximately one month, at a cost of [redacted] If this approach is feasible, a follow-on program will be pursued.

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VI. Coordination

An explanation of this study will be presented at a Technical Development Committee meeting during the week of 13 April 1964. At this meeting, representatives of the various divisions will be briefed. Other agencies will be included in the program when its feasibility has been established. Although other agencies such as RADC are now involved in the production of integration instruments, no human system capability study has been undertaken.

VII. Security

The project will be classified [redacted] because of its association with the sponsor. This company is listed as one of the 1110 firms of West Coast Contractors on whom files are maintained by the Security Staff, OL, according to a memorandum of 23 December 1963 from [redacted]

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